# EVESHAM MUNICIPAL UTILITIES AUTHORITY

## Drought Proofing

## Evesham's Municipal

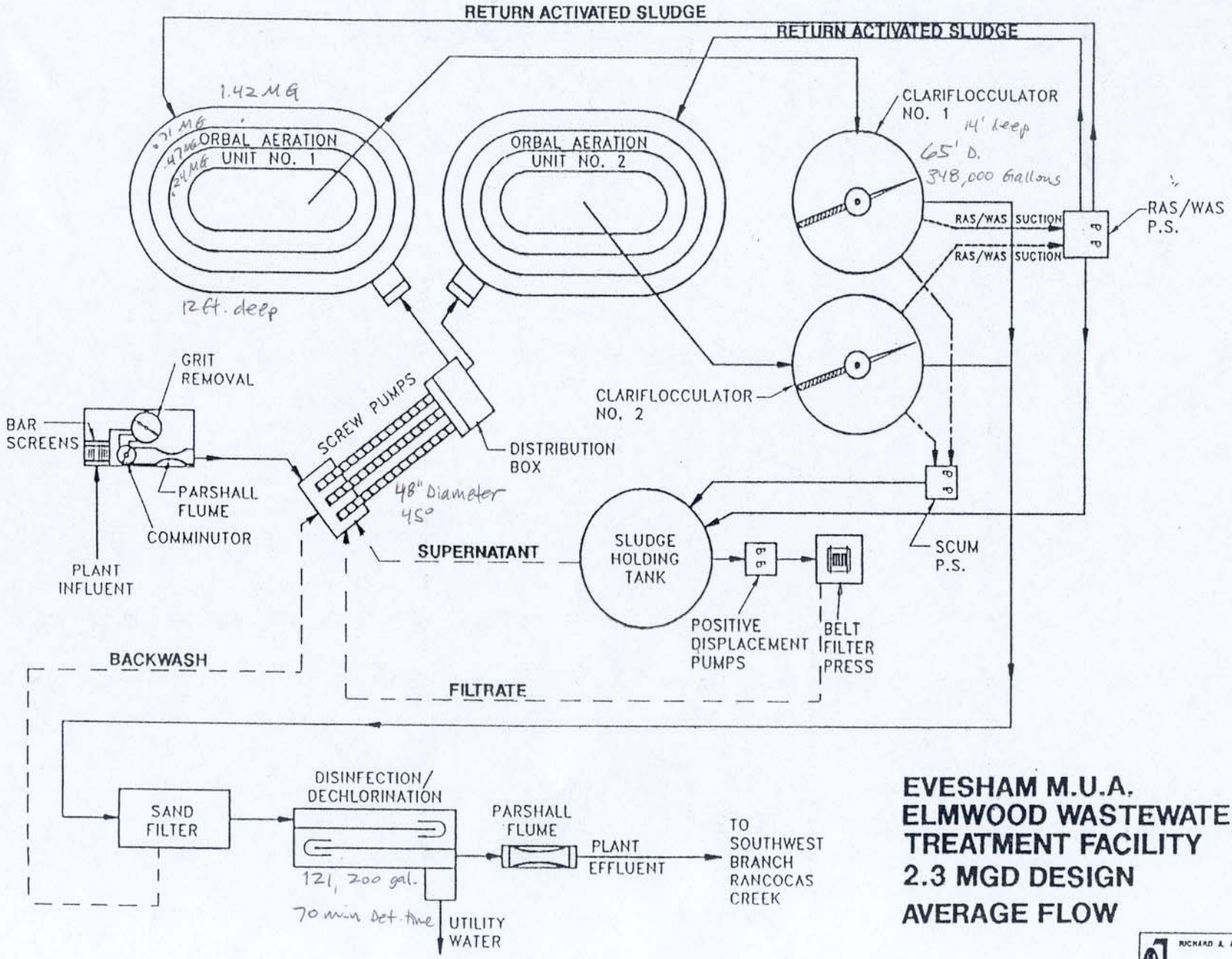
## Golf Course



Rocco J. Maiellano, EMUA
Operations Manager


ENTER ONLY
EVESHAM MUNICIPAL
UTILITIES AUTHORITY
ELMWOOD WASTEWATER
TREATMENT FACILITY

# Evesham M.U.A.
# Elmwood Plant
# Technical Description




# EVESHAM M.U.A.
# ELMWOOD WASTEWATER TREATMENT FACILITY
# 2.3 MGD DESIGN
# AVERAGE FLOW

RICHARD A. ALAIMO ASSOCIATES
Consulting Engineers

Raw sewage flows into the plant to a bar screen, grit chamber, and comminutor. Three forty-eight (48") (1219.2 mm) diameter internal screw pumps lift the sewage approximately twenty feet (20') (6.1m) where it is distributed to the rings of each of two Orbal Process extended aeration unit. Return sludge is then mixed with the influent sewage to begin the biochemical treatment process. After nitrification/denitrification in the mid-ring and final polishing is accomplished in the inner ring.

The liquid then flows to the respective clarifloccculator where alum and caustic are added. A portion of the sludge is returned to the outer ring of each orbal tank and scum, heavy solids, and waste sludge are sent to the sludge holding tank where the mixture is aerated, settled, and thickened prior to dewatering by belt filter presses. The dewatered sludge is ultimately sent to the Burlington County Solid Waste Facility Co-Composting plant.

From the clarifloccculators, the liquid passes through three rapid sand filters and the chlorine contact tank with dechlorination and post aeration. The treated effluent is then discharged to the Southwest Branch of the Rancocas Creek.

In addition to the process facilities, the Evesham Municipal Utilities Authority in 1991 constructed the administration and personnel support building with offices, a water quality laboratory, locker rooms, lunch and training rooms. Attached to the administration building is an eight-bay maintenance garage. Nearby are the chlorine and sulfur dioxide building, the pump, alum, caustic building and sludge dewatering building.


BUILDING NO. 2
CONTROL BUILDING
AND GARAGE

# PERMIT REQUIREMENTS

# NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM

The New Jersey Department of Environmental Protection hereby grants you a NJPDES permit for the facility/activity named in this document. This permit is the regulatory mechanism used by the department to ensure your discharge will not harm the environment. By complying with the terms and conditions specified, you are assuming an important role in protecting New Jersey's valuable water resources. Your acceptance of this permit is an agreement to conform with all of its provisions when constructing, installing, modifying, or operating any facility for the collection, treatment, or discharge of pollutants to waters of the state. If you have any questions about this document, please feel free to contact the department representative listed in the permit cover letter. Your cooperation in helping us protect and safeguard our state's environment is appreciated. NJPDES Permit ID: NJ0024031

| Permittee | Co-Permittee |
|---|---|
| EVESHAM MUA<br>PO BOX 467<br>RT 70, TRI-TOWN PLAZA<br>MARLTON NJ 08053 | |
| **Property Owner** | **Location of Activity** |
| EVESHAM MUA<br>PO BOX 467<br>MARLTON NJ 08053 | ELMWOOD WWTP<br>NORTH ELMWOOD ROAD<br>MARLTON NJ 08053 |

| CURRENT AUTHORIZATION Covered By This Approval And Previous Authorization | Issuance Date | Effective Date | Expiration Date |
|---|---|---|---|
| A :DOMESTIC SURFACE WATER DISCHA | 01/30/1996 | 02/01/1996 | 01/31/2001 |
| AS :SLUDGE QUALITY ASSURANCE REPO | 01/30/1996 | 02/01/1996 | 01/31/2001 |
| FINAL MODIFICATION TO CATEGORY A | 07/30/1999 | 09/01/1999 | 01/31/2001 |

DSW: 001
CLASSIFICATION: FW2-NT
DISCHARGED TO: RANCOCAS CREEK
LATITUDE: 39°53'29"
LONGITUDE: 74°52'55"

By Authority of:
COMMISSIONER'S OFFICE

Debra Hammond
DEP AUTHORIZATION
DEBRA HAMMOND, BUREAU CHIEF
DIVISION OF WATER QUALITY, BPSP REGION 2

(Terms, conditions and provisions attached hereto)

Attachment A-Reuse Sites
Page 1 of 1
Permit No. NJ0024031

| Approved Reuse Sites | | | Date |
|---|---|---|---|
| No. | Name | Location | |
| RO1 | Indian Springs Golf Course | Elmwood Road and Tuckerton Road<br>Marlton, NJ | 9/01/99 |
| RO2 | Evesham Elmwood WWTP | North Elmwood Road<br>Marlton, NJ | 9/01/99 |

| Parameter | Units | Averaging Period | Effluent Limitations | Measurement Frequency | Sample Type |
|---|---|---|---|---|---|
| Flow (10) | Mgd | Monthly Avg<br>Daily Max | (2) (10)<br>(2) | Continuous | Continuous |
| 5-Day Biochemical Oxygen Demand (BOD5)(1) | Kg/day | Monthly Avg<br>Weekly Avg | 113<br>169 | 1/Week | Calculated |
| 5-Day Biochemical Oxygen Demand (BOD5) (1) | Mg/L | Monthly Avg<br>Weekly Avg | 10<br>15 | 1/Week | 24 Hr. Composite |
| BOD5 Minimum Percent Removal | % | Monthly Avg | 85 | 1/Week | Calculated |
| Total Suspended Solids (TSS) (1) | Mg/L | Monthly Avg<br>Weekly Avg | 10<br>15 | 1/Week | 24 Hr. Composite |
| (11) | | (*)Instant Max | 5.0 | 1/Week | Grab |
| TSS Minimum Percent Removal | % | Monthly Avg | 85 | 1/Week | Calculated |

| Parameter | Units | Averaging Period | Effluent Limitations | Measurement Frequency | Sample Type |
|---|---|---|---|---|---|
| Turbidity **Recycle Water** (11) | **NTU** | **(*)Instant Max** | **(2)** | **Continuous** | **Continuous** |
| Total Kjeldhal Nitrogen Summer (3) | Kg/day | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | Calculated |
| Total Kjeldhal Nitrogen Summer (3) | Mg/L | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | 24 Hr Composite |
| Total Kjeldhal Nitrogen Winter (3) | Kg/day | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | Calculated |
| Total Kjeldhal Nitrogen Winter (3) | Mg/L | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | 24 Hr Composite |
| Phosphorus (Total as P) Summer (3) | Kg/day | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | Calculated |
| Phosphorus (Total as P) Summer (3) | Mg/L | Monthly Avg<br>Weekly Avg | 1.0<br>(2) | 1/Week | 24 Hr Composite |
| Phosphorus (Total as P) Winter (3) | Kg/day | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | Calculated |
| Phosphorus (Total as P) Winter (3) | Mg/L | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | 24 Hr Composite |

| Parameter | Units | Averaging Period | Effluent Limitations | Measurement Frequency | Sample Type |
|---|---|---|---|---|---|
| Ammonia (Total as N) Summer (3) | Mg/L | Monthly Avg<br>Daily Max | 1.6<br>4.0 | 1/Week | 24 Hr Composite |
| Ammonia (Total as N) Winter (3) | Kg/day | Monthly Avg<br>Daily Max | 64<br>106 | 1/Week | Calculated |
| Ammonia (Total as N) Winter (3) | Mg/L | Monthly Avg<br>Daily Max | 5.7<br>9.4 | 1/Week | 24 Hr Composite |
| Chlorine Produced Oxidants (5) | Kg/day | Monthly Avg<br>Daily Max | 0.07(5)<br>0.23 (5) | 2/Day | Calculated |
| Chlorine Produced Oxidants (5) (11) | Mg/L **Recycle Water** | Monthly Avg<br>Daily Max | 0.006 (5)<br>0.02 (5) | 2/Day | Grab |
| | | **(*)Instant Min** | **1.0** | **2/Day** | **Grab** |
| Acute Toxicity, (LC50) [Acute Toxic Units] | % | Minimum [Maximum] | 94 [TUa=1.06] | 1/Quarter | See Part IV-A |
| Nitrate, Total as N (NO3) | Kg/day | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | Calculated |
| Nitrate, Total as N (NO3) | Mg/L | Monthly Avg<br>Weekly Avg | 2.0<br>(2) | 1/Week | 24 Hr Composite |
| Total Dissolved Solids (9) | Kg/day | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | Calculated |
| Total Dissolved Solids (9) | Mg/L | Monthly Avg<br>Weekly Avg | (2)<br>(2) | 1/Week | 24 Hr Composite |

| Parameter | Units | Averaging Period | Effluent Limitations | Measurement Frequency | Sample Type |
|---|---|---|---|---|---|
| Fecal Coliform (geometric mean) | # per 100 mL | Monthly Avg (4) | 200<br>400 | 4/Month | Grab (8) |
| (11) | **Recycle Water** | **(*)Weekly Median<br>Instant Max** | **2.2**<br>14 | **4/Month** | **Grab** |
| Enterococci (geometric mean) | # per 100 mL | Monthly Avg<br>Instant Max | (2)<br>(2) | 1/Month | Split-Grab (8) |
| Dissolved Oxygen (minimum) | Mg/L | Weekly Avg<br>24 Hr Min | 6.5<br>5.0 | 1/Week | Grab |
| Oil and Grease | Mg/L | Monthly Avg<br>Instant Max | 10<br>15 | 1/Month | Grab |
| Temperature (1) | °C | Minimum<br>Monthly Avg<br>Maximum | (2)<br>(2)<br>(2) | 2/Day | Grab |
| PH (1) (6) | Su | Minimum<br>Maximum | 6.0<br>9.0 | 2/Day | Grab |
| Alkalinity, Total (as $CaCO_3$) (7) | Mg/L | Monthly Avg<br>Daily Max | (2)<br>(2) | 1/Week | 24 Hr Composite |
| Ammonia (Total as N) Summer (3) | Kg/day | Monthly Avg<br>Daily Max | 18<br>45 | 1/Week | Calculated |

# Sodium Adsorption Ratio (SAR):

The effect of an irrigation water source on the relative permeability of a soil. SAR is the ratio of the sodium ion concentration to that of the calcium plus magnesium.

SAR =

$$\frac{Na}{\sqrt{\frac{Ca + Mg}{2}}}$$

Irrigation water with a high SAR, SAR>9, can cause severe permeability problems when applied to fine textured (clay) soils over a period of time.

Evesham M.U.A. SAR = 2.2

# NON-RESTRICTED REUSE APPLICATIONS

## IRRIGATION OF

- Public Parks
- Recreation Centers
- Athletic fields
- School yards
- Playing fields
- Highway medians and shoulders

# IRRIGATION OF

- Landscaped areas surrounding public buildings and facilities
- Landscaped areas surrounding single-family and multi-family residences
- General wash down
- Maintenance activities
- Landscaped areas surrounding commercial, office, and industrial developments
- Golf courses

# ADDITIONAL USES

- Dust control and concrete production for construction projects.
- Fire protection through reclaimed water fire hydrants.
- Toilet and urinal flushing in commercial and industrial buildings.

# EVESHAM TO BEGIN BENEFICIAL REUSE OF RECLAIMED WATER

# IDENTIFICATION OF PIPES AND APPURTENANCES

All components and appurtenances of the non-potable system should be clearly and consistently identified throughout the system.

Identification should be through color coding and marking. The non-potable system:

- **Pipes**
- **Pumps**
- **Outlets**
- **Valve Boxes**

Should be distinctly set apart from the potable system. The methods most commonly used are unique colorings, labeling, and markings.

Non-potable pipe and appurtenances are painted purple (AWWA, 1994) or can be integrally stamped or marked.

The pipe may be wrapped in purple polyethylene vinyl wrap.

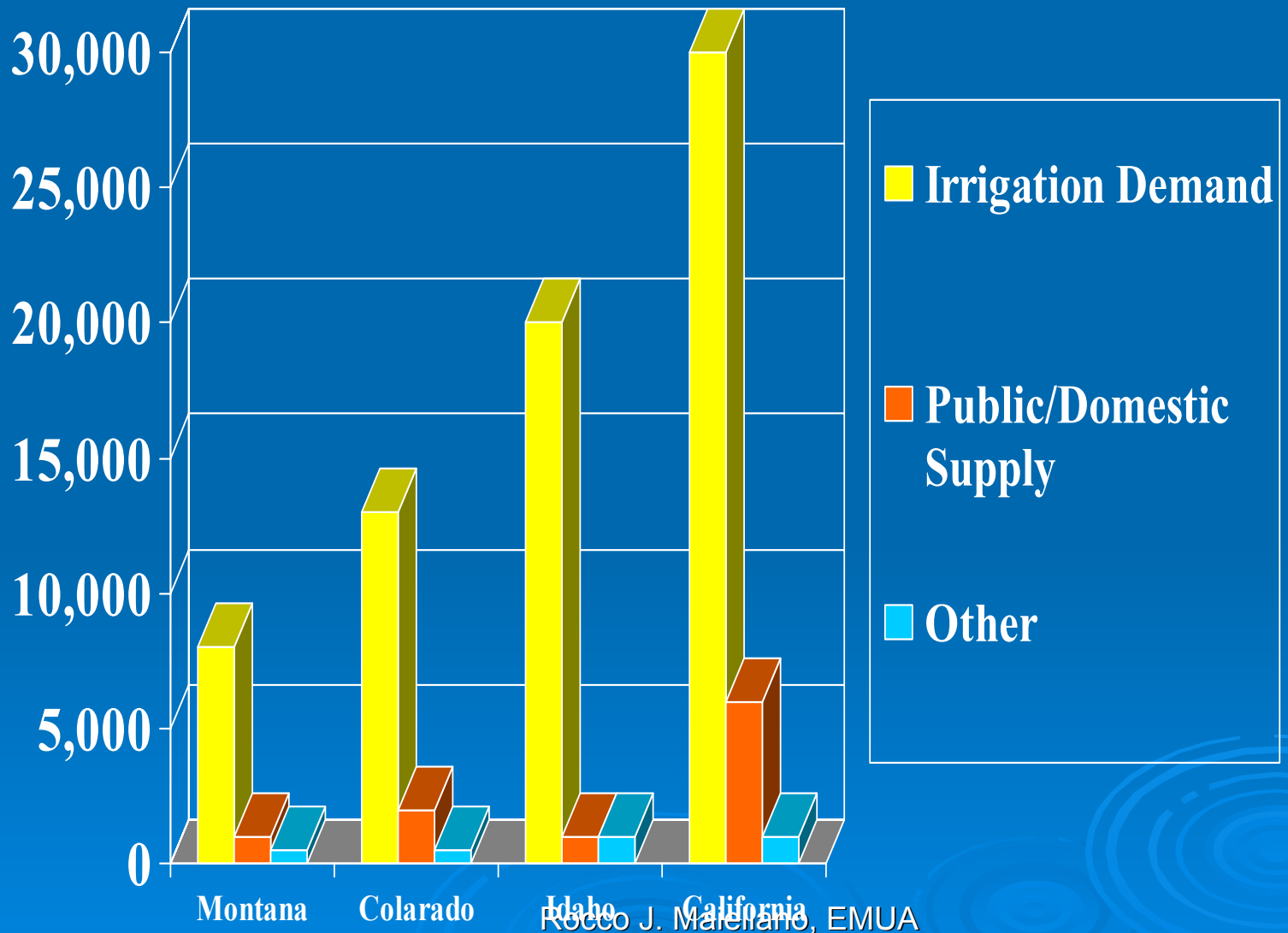

Amici
BAR & RESTAURANT
ISCC
CENTER FOR THE ARTS
Indian Spring
COUNTRY CLUB
PUBLIC WELCOME

As the weather warms the golfers flocked to the tees in the spring of 2001, the Evesham Municipal Utilities Authority (MUA) and the Township Council inaugurated the beneficial reuse of reclaimed water at the Evesham Township owned Indian Spring Golf Course. The event marked the culmination of five years of cooperative efforts between the MUA, the Township Council and the New Jersey Department of Environmental Protection (NJDEP).

Drought conditions during the summer of 1995 prompted Evesham Township officials to focus on the Township's Indian Spring Golf Course's use of the two million gallons [7,570 m3 (cubic meters)] of water which met the standards of the New Jersey Pinelands Commission that was being discharged into the Rancocas Creek each day and flowing out of town.

In early 1996, MUA and Township officials met with the Department to request that the application process for the beneficial reuse project be brought closer in line with those in effect in such water deficient States such as California, Arizona and Florida. The Department encourages the MUA and Township to proceed with the application process and offered to provide assistance whenever possible.

# Comparison of Agricultural Irrigation , Public/Domestic, and Total Freshwater Withdrawals



Shortly after the meeting with the Department, an open meeting of all Township officials, both elected and volunteer, as well as representatives from all local environment organizations was held to discuss the proposed beneficial reuse project. The meeting was very well attended and the comments received were all supportive of the concept.

The MUA, through its Engineer – the Alaimo Group – applied for and received approval to its Wastewater Management Plan to allow for a groundwater discharge and also received a Treatment Works Approval for the construction of the facilities required at both the treatment plant and the golf course. These applications were processed in a routine manner by the Department with no major complications.

In 1998 the Department developed a draft Technical Manual for the Beneficial Reuse of Reclaimed Water. This manual resolved many of the issues over which the MUA was concerned and allowed the application process to proceed smoothly. A modification to the plant's NJPDES permit was issued on July 30, 1999.

The technical manual is in the process of being revised by the EPA in 2003.

To facilitate the irrigation of the golf course with reclaimed water, the MUA had constructed a 2,700 L.F. (823 m) force main and had contracted for the installation of a pump into the Elmwood plant's chlorine contact tank. The pump starter was interlocked with an on-line chlorine residual analyzer and an on-line turbidimeter. These instruments ensured that the reclaimed water is adequately disinfected prior to transmission to the golf course.


HACH

The Township and the MUA constructed a new pond on the golf course to receive the reclaimed water exclusively. New irrigation pumps supply the irrigation system from the pond and was incorporated into an upgrade of the golf course's irrigation system.


Shielded
for clean
power

The MUA and the Township entered into an agreement that defined the responsibilities of both parties. The MUA agreed to provide reclaimed water of a quality which meets the Department's requirements and the Township agreed to meet the Department's requirements for rates of the application, setbacks and public notification. The use of reclaimed water by the Township will save up to 100,000 gallons (378 m3) per day of water from reduced pumpage of the PRM aquifer. The aquifer is a major supplier of potable water throughout southern New Jersey and has been declared a critical aquifer by the Bureau of Water Allocation.

Working together, the Evesham Municipal Utilities Authority, Evesham Township Council and the Department of Environmental Protection has developed a first of its kind project to reuse reclaimed water in the State of New Jersey.

During the 2002 irrigation season, the Indian Spring Golf Course sprayed over 30 million gallons (113,562 m3) of recycled water while we experienced at the same time one of the worst droughts in the past 25 years.

# PUBLIC HEALTH SAFEGUARDS

The major concern guiding design, construction, and operation of a reclaimed water distribution system is the prevention of cross connections. A cross connection is a physical connection between a potable water system used to supply water for drinking purposes and any source containing non-potable water through which water could be contaminated.

Another major concern is to prevent improper use or inadvertent use of reclaimed water as potable water. To protect the public health from the outset, a reclaimed water distribution system should be accompanied by health codes, procedures for approval (and disconnection) of service, regulations governing design and construction specifications, inspections and operation and maintenance staffing.

Public health protection measures that should be addressed in the planning phase are as follows:

- Establish that public health is the overriding concern
- Devise procedures and regulations to prevent cross connections
- Develop a uniform system to mark all non-potable components of the system

- Prevent improper or unintended use of non-potable water through a proactive public information program

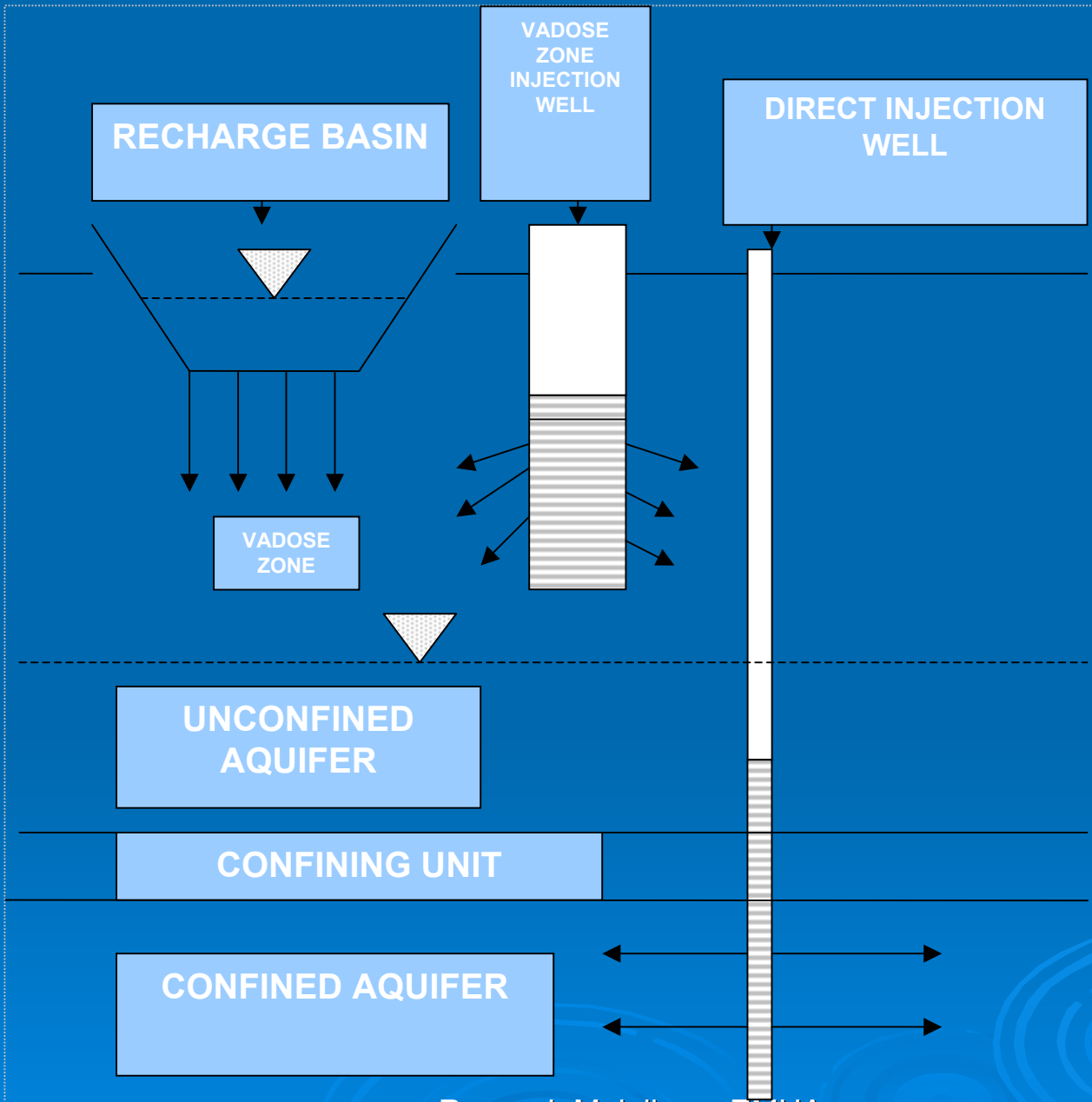
- Provide for routine monitoring and surveillance of the non-potable system

- Establish and train special staff members to be responsible for operations, maintenance, inspection, and approval of reuse connections

- Develop construction and design standards

- Provide for the physical separation of the potable water, reclaimed water, sewer lines and appurtenances

The Township and the MUA are already anticipating the eventual expansion of the reclaimed water system to provide irrigation water to the Elmwood plant's landscaped areas, the Township Municipal Building and recreation fields throughout the town. It is anticipated other municipalities will see the benefits of beneficial reuse and undertake similar projects.


VADOSE ZONE INJECTION WELL
RECHARGE BASIN
DIRECT INJECTION WELL
VADOSE ZONE
UNCONFINED AQUIFER
CONFINING UNIT
CONFINED AQUIFER

# QUESTIONS AND COMMENTS

# THANK YOU